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Strain and strain rate for evaluating of right ventricular functional profile in patients with COPD and metabolic syndrome

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Background: The association between COPD and metabolic syndrome (MS) are frequently seen in daily clinical practice, but the cardiac impact on right ventricular (RV) functional profile using strain and strain rate of free wall is poorly studied in this group of patients.

Methods: Thirty-two patients with COPD (FEV1= 48.9±0.4; sPAP= 32.8 ±0.4; 6-MWD= 391.9±3.9) was compared with thirty-one patients with COPD and MS (FEV1= 42.8±0.8; sPAP= 32.8 ±0.4; 6-MWD= 391.9±3.9) regarding right ventricular systolic strain and strain rate. Longitudinal strain and strain rate analysis in the basal and mid segments of lateral wall of RV were performed in both groups using Velocity Vector Imaging technique. All results are expressed as mean ±SE using 15.0 SPSS version.

Results: Strain and strain rate in all segments of RV lateral wall were significantly decreased in COPD and MS group (strain basal and mid: -23.3±0.2 respectively -22.4±0.2; strain rate basal and mid: -1.4±0.0 respectively -1.2±0.0) compared with COPD alone (strain basal and mid: -18.6±0.2 respectively -16.8±0.2; strain rate basal and mid: -1.2±0.0 respectively -1.0±0.0) (p <0.001). In the COPD and MD group, decreased of 6-MWD correlated significantly with basal reduced strain rate of VD (r=0.38, p=0.03) and elevation of sPAP correlated significantly with basal and mid reduced strain of RV (r=-0.51, p=0.01 respectively r=-0.41, p=0.02).

Conclusions: The assessment of strain and strain rate of free wall of RV is a good clinical tool in evaluating of right functional cardiac profile and may be in prediction of exercise capacity in patients with COPD and MS.

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Speckle tracking echocardiography as a potential diagnostic method for acute myocarditis : a pilot comparaison to cardiac MRI

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Introduction: Cardiac MRI is the current gold standard for diagnosis of acute myocarditis (AM) but is often not available in the emergency setting. Ultrasound imaging using new imaging modalities such as STE is a potential alternative.

Objective: Our aim was to test whether speckle tracking echocardiography (STE) can assist in the diagnostic of AM.

Methods: Patients admitted for AM (n = 10), defined as acute chest pain, elevated troponin, normal coronary angiogram and presence of epicardial delayed enhancement (EDE) with cardiac MRI, and control patients (n = 10) were studied. For each patient, left parasternal short axial views were acquired in 2D mode at basal, mid-ventricular and apical levels and divided into a 16-segment model. Circumferential strain (CS) and radial strain (RS) were automatically calculated for each segment (n = 320) using a dedicated workstation. Time to peak of CS was measured for each segment and expressed as degrees of RR cycles (= 360°). In patients with AM, segments were categorized as with or without EDE.

Results: Mean CS and time to peak were higher in patients with AM as compared to control patients (-15.3 ± 2.5 % vs. -20.8 ± 1.4 % and 50 ± 23° vs. 5 ± 10°, p < 0.05; respectively), whereas RS was similar (42.8 ± 12.7 % and 55.7 ± 13.4 %; p = 0.07). In patients with AM, cardiac segments with EDE had a lower CS and delayed time to peak as compared to segments with no delayed enhancement (-6.4 ± 8.2 % vs. -16.7 ± 7.1 %, 23 ± 27° vs. 4 ± 11°; respectively; p < 0.05), but similar RS values (37.7 ± 16.8 % vs. 38.4

± 15.9 %, respectively; p = 0.86). CS ≥ -9 % or time-to-peak of CS > 30° in at least two segments identified patients with AM with a specificity of 90%, a sensitivity of 100% and an accuracy of 95%.

Conclusion: This pilot study suggests that STE may be useful in the diagnosis of AM, particularly when using a composite index of CS value ≥ -9 % or time-to-peak of CS > 30° in at least two segments.

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Evaluation of Coronary CT scans radiation dose and image quality using different scanning protocol on a 256-slice CT scanner

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Background: Cardiac CT scan is a new, performing, non invasive and accurate coronary imaging method to detect the presence or absence of coronary lesions in symptomatic or asymptomatic patients. It has been hardly criticized about the patients radiation dose. New acquisition protocols has been developed to decrease the delivered radiation dose.

Objective: To evaluate the estimated radiation dose and image quality difference of prospective ECG-gating (step-and-shoot) mode and retrospective ECG-gating (helical) coronary computed tomography angiography (CTCA) on a 256-slice scanner.

Methods: Radiation doses were estimated for 373 patients routinely scanned with either prospective or retrospective ECG-gating. Only patients with heart rate less than 65 bpm were scanned using step-and-shoot technique. All examinations were performed on the same computed tomography scanner using the standard injection protocol. Image quality was assessed objectively using the signal-to-noise ratio on axial coronary images and subjectively by coronary segment quality scoring into a 3 grade score.

Results: It was found that radiation doses associated with prospective ECG-gating were highly significant lower than retrospective ECG-gating (3.5 ± 1.4 mSv versus 15.4 ± 4.6 mSv respectively, p<0.0001). No statistically significant differences in image quality were observed between the two scanning protocols for objective quality assessments but the image quality was highly statistical significant better in prospective ECG-gating in comparison to retrospective ECG-gating (p<0.0001) for subjective scanning evaluation.

Conclusion: prospective ECG-gating using a 'step-and-shoot' protocol effectively reduces radiation doses in 256-slice CT coronary angiography with better image quality. This is a definite answer cardiac CT over irradiation. When applicable this should be the standard acquisition protocol.

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Comparison between non invasive coronary flow reserve and fractional flow reserve in the setting of left anterior descending artery stenosis of intermediate severity

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Background: The functional significance of left anterior descending artery (LAD) stenosis of angiographic intermediate severity (IS) (50-70% diameter stenosis) is challenging.

Objective: to compare the value of non-invasive coronary flow reserve (CFR) to the invasive fractional flow reserve (FFR) in patients (pts) with LAD stenosis of IS.

Methods: 46 consecutive pts (mean age 63 ± 13 years, 11 females, mean LVEF 63 ± 8 %) with various risk factors (diabetes 17%, hypertension 52%, smoking 28%, dyslipidemia 74%), no previous anterior myocardial infarction, and with an LAD stenosis of IS (55 ± 5% diameter stenosis, QCA) were prospectively studied. They underwent FFR with intracoronary bolus adenosine (150 µg), 3 cms distal to the stenosis, and CFR using intravenous adenosine (140 µg/kg/min over 2 min), in the distal part of the LAD, the same day in nearly all cases. CFR was defined as hyperemic peak diastolic LAD flow velocity divided by baseline flow velocity (normal value ≥ 2) and FFR was